

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Recommendations of the Independent Panel)	EB Docket No. 06-119
Reviewing the Impact of Hurricane Katrina on)	
Communications Networks)	
)	
)	

COMMENTS OF TROPOS NETWORKS

Tropos Networks submits these comments in response to the Commission's Notice of Proposed Rulemaking (NPRM) in the above proceeding. The NPRM addresses the recommendations of the Commission's Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks (Independent Panel).

An integral element of communications networks capable of surviving or recovering expeditiously from a catastrophic event is diverse and redundant facilities. Redundancy and diversity depend not only on pre-positioning assets but also compatible yet varied facilities integrated into one system. Tropos agrees with the Independent Panel's recommendation that the Commission promote diversity and redundancy. The Commission should profile technologies and networks capable of surviving or recovering quickly from catastrophic events.

Tropos Networks

Tropos Networks, headquartered in Sunnyvale, California, provides wireless technology that delivers broadband access using unlicensed spectrum at 2.4 GHz. Tropos technology provides wireless broadband (>1Mbps) over large geographic areas.

Its MetroMesh architecture provides efficient system planning and installation at substantial savings over legacy systems by eliminating costly backhaul and proprietary client devices. It maximizes user input and system capacity for advanced applications encompassing voice and video. Portable wireless devices, now mass produced to operate in a Wi-Fi environment, are a significant element toward reducing cost and expanding consumer choice. Tropos technology allows one physical network to be separated into multiple secure virtual segments for use by different customers.

With its partners, Tropos technology has emerged as a facilities based broadband provider in a market desperately needing competition. Tropos is the technology provider to EarthLink in its Philadelphia, Anaheim and Pasadena projects and in the Google EarthLink San Francisco project. Tropos equipment in New Orleans, in place prior to Hurricane Katrina to support video surveillance, has been expanded in coverage and use. The technology is providing quality broadband service to numerous police, fire and emergency medical service agencies.

Tropos technology is now deployed in over 350 commercial and government projects. Its roots in public safety evolved from the lack of cost effective broadband; it was a response to a market reflecting high expense and slow data speeds. Wi-Fi mesh has emerged as more than a supplement to legacy radio systems and has become an integral element in agency communications systems. Tropos participated in the Independent Panel's hearings because of its experience in the Katrina recovery effort. Its deployment in New Orleans prior to Katrina served as a base where, with several private entities and government agencies, 22 mesh networks throughout the Gulf Coast became operational in a number of days.

In recognition of the importance of these kinds of networks, both the House and the Senate are moving forward with legislation that would ensure that local governments can partner with the private sector or directly deploy municipal broadband networks that will promote homeland security and that will ensure the redundancy necessary for communities to recover from catastrophic events. Both Title IV of H.R. 5252, the Communications Opportunity, Promotion, and Enhancement Act of 2006, and Title V of the Senate companion legislation, would effectively repeal those State laws that stand in the way of local governments deploying the kinds of community broadband networks that are capable of surviving or recovering quickly from catastrophic events. Given the strong support on Capitol Hill for community broadband networks, the Commission should embrace the technologies that will allow them to flourish.

The Independent Panel's Report and Recommendations

The Independent Panel found it important to strengthen the diversity and redundancy of public safety and commercial networks. It urged the pre positioning of equipment so that facilities are in place to restore wide ranging network failures. The Independent Panel believes that there should be greater access to information regarding all types of communications systems, particularly new technologies. It recommended that the Commission educate public safety agencies about the availability and capability of non-traditional technologies; it specifically referenced license exempt wireless systems. The Independent Panel's work is an important recognition of the need to strengthen communications networks and a valuable contribution to meeting this challenge.

The Commission Should Define and Embrace More Integrated Redundant and Diverse Communications Systems

Tropos experience is that wireless mesh systems, built around the 802.11 standard that enable non proprietary client devices, have been successfully integrated into core commercial and government communications systems, including public safety. In a number of projects wireless mesh is the primary facility delivering broadband to public safety. Its cost efficient deployment and range of services, voice, data and video, add substantial diversity and redundancy to a system. The Wi-Fi facilities that survived Katrina in New Orleans and those constructed and deployed in its aftermath reflect how a myriad of technologies, including legacy systems, can be integrated to provide vigorous broadband service in emergency circumstances.

Working with several government agencies, a computer chip and equipment manufacturer, an Internet backbone provider, a provider of proprietary 5 GHz equipment, and a satellite provider, Tropos mesh technology was deployed in 22 locations in the Gulf region in a matter of days at costs (borne by the companies) of less than \$100,000 for each deployment.¹ The infrastructure consisting of wireless mesh routers, laptop computers, VOIP and satellite phones, 5 GHz licensed spectrum and 2.4 GHz unlicensed spectrum and a wireline connection provided real time access to the Internet, voice and data communications to public safety, assisting agencies and victims. Integrating these networks and facilities was not novel, but a result of the resiliency and flexibility of mesh technology.

¹ See Presentation of Ben Moebes, Tropos Networks before the Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks, Jackson, Mississippi (March 6, 2006) and Letter of Ellen M. Kirk, Vice President, Marketing, Tropos Networks, to Ms. Nancy J. Victory, Chair of the Independent Panel (March 9, 2006) at <http://www.fcc.gov/eb/hkip/GSpeakers060306.html>.

At the center of mesh technology is the ability to transmit information, at high speeds and high service standards, through the most efficient route to its destination.

It is in the routing protocols where enormous efficiencies and capabilities have evolved to deliver wireless broadband. It is the ability of the information to be transmitted over multiple hops that optimizes the data path between the wireless client device and the wireline servers. Because of the speed and quality of transmission between hops, an enormous broadband cost factor is eliminated- the need to connect each router point to the wired network. Instead, the information is transmitted across the wireless routers to the wireline connection.²

Contributing to the significant cost savings of wireless mesh networks is the ease of construction and build out, a critical element in constructing redundant, diverse and economical networks. Each router of the mesh network is the size of a breadbox and is attached to a lamppost, telephone pole or other fixture with a power source. There are no large towers. There are no zoning ordinance or variance approvals required. No specialized skills are needed; installation averages 15 minutes per pole. There are no multiple truck rolls needed once installation is completed. Back up power supply, whether through battery or solar panels, can be affixed at the time of installation or later. The equipment is designed and built for environmental extremes. If the network expands or is altered, there is no need to return to adjust the routers already in place. Expeditious and straightforward construction, combined with the lack of wireline connection to each router presents not only enormous cost savings over wireline and licensed wireless alternatives but a deployment timeframe demanded by recovery circumstances.

² See Presentation of Malik Audeh, Senior Engineer, Tropos Networks, *Wireless Broadband Using Mesh Technology*, contained in WT Docket 05-157 (October 24, 2005).

Deployment efficiencies also emanate from the non-proprietary character of the technology. Designed and built around the 802.11 Wi-Fi standard, an agency is able to select the laptop, PDA device, VOIP phone or other device, virtually all of which are now manufactured to the standard, contributing further to affordability and ease by which it can be installed and made operational.

Enhanced diversity and redundancy has emerged from mesh technology's integration into agency communications systems. Legacy land mobile radio, wireline, microwave and mesh facilities provide a much broadened capability to remedy default circumstances expeditiously. That voice, data and Internet access were weaved together so quickly after Katrina emphasizes a communication system's enhanced strength when it has this capability to start with.

Public safety communications great challenge is that it operates in an environment of scarce spectrum resources yet demands diverse and redundant networks with the ability to communicate across agencies, networks and devices. Expeditiously dispatching the proper resources and expertise depends on quality wireless communications among agencies. Because spectrum is so valuable, it also must be used for daily operations. Wireless mesh technology is demonstrating how it is enhancing communications services, strengthening the ability to survive catastrophic events and recovering more expeditiously.

The Independent Panel's recommendations focused on maintaining and restoring communications capability in the range of emergencies. Its valuable work brings clarity to the need for more diverse and redundant networks. Ensuring that there is no single point of failure, that back up power can be readily accessed, that infrastructure is

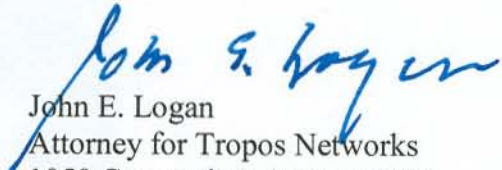
resilient, and that connecting to other networks and devices can be gracefully accomplished are the fundamentals to more diverse and redundant networks. As mesh networks become more integrated in communications systems, capability will increase measurably, reflecting its vital part of emergency response and recovery.

Tropos urges the Commission, whether through its advisory committees addressing network reliability or other means, to emphasize what diversity and redundancy require. Tropos agrees with the Independent Panel that part of defining robust communications networks is profiling technologies capable of integrating with legacy systems that can meaningfully contribute to fulfilling this objective.

Respectfully submitted,

Tropos Networks

Ellen M. Kirk
Vice President- Marketing
555 Del Ray Avenue
Sunnyvale, California 94085
408.331.6800



John E. Logan
Attorney for Tropos Networks
1050 Connecticut Avenue, NW
Tenth Floor
Washington, D.C. 20036
202.772.1981

August 7, 2006